Forest Insect & Disease Management

Evaluation Report
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EVALUATION OF A SUGAR MAPLE BORER SURVEY TECHNIQUE
ALLEGHENY NATIONAL FOREST, PENNSYLVANIA
1977

By

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INTRODUCTION

The sugar maple borer, Glycobius speciosus (Say), is a common cause of defect throughout the sugar maple range. Damage is caused by wood boring larvae and from wood decay fungi which enter through beetle-caused bark breaks. Attacked trees usually have spiral-shaped seams within the first twenty feet of the bole (Figure 1). In many cases, the seams rupture to show larval mines which were etched in the sapwood (Figure 2). All diameter classes are attacked.

OBJECTIVE

The objective of this survey was to evaluate a sugar maple borer survey technique for standing trees.

METHODS

This technique is a modification of one used by Anderson and Mosher to survey for nectria canker in Michigan birch (in press).

A five-mile grid was laid out on a map of the Allegheny National Forest. Forty-six plots were established throughout the forest as closely as possible to grid lines. The relative percentage of sugar maple was estimated for each plot with areas containing less than 20 percent sugar maple excluded from the survey (Figure 3). Each plot consisted of fifty sugar maple trees in a twelve-feet wide swath. One plot was limited to forty trees because of a sharp break in a forest type. All plots were entered from secondary roads and trails and randomly started between one and six chains into the forest. The DBH was measured to the nearest inch for each tree two inches and over. For attacked trees, the height of the attack(s) was noted.

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RESULTS AND DISCUSSION

The survey took ten man-days to complete. Of the 2,220 trees examined, incidence was much higher in sawtimber trees (16.3 percent of those over 11 inches DBH. For all diameter classes under 11.0 DBH (poles and regeneration) only 2.2 percent were affected. The average diameter of an attacked tree was 9.39 ± 0.34 in contrast to 5.99 ± 0.08 for unattacked trees (Table 1 and Figure 4).

Multiple attacks were common. Sixteen percent of attacked trees showed two or three scars. The average height of an attack on the tree bole was 9.1 feet. This is significant since the butt log is the most valuable.

Percent of borer-free trees per plot ranged from 80.0 to 100 ($\bar{x} = 94.7 \pm 0.82$). Eighteen plots had no infested trees. Non-attacked and sparsely attacked plots usually consisted of smaller sized diameter classes or were low in percent of host species composition. In general, plots with these characteristics were more prevalent in the western and southern parts of the forest, especially in the Sheffield and Marienville Ranger Districts (Figure 3).

CONCLUSIONS

1) The technique gives an accurate estimate of percent of within-stand borer-free trees at the t-1 (66 2/3 percent) confidence level.

2) It indicates which diameter classes are being affected most.

3) It shows where on the forest the populations are concentrated.

4) It is simple, fast, and inexpensive; requiring only a map and a diameter tape (or Biltmore stick) and a clipboard.

5) If tied in with an accurate means of estimating within-tree impact, it can be used to determine volume loss to the borer in standing trees. Unfortunately, current methods for determining within-tree impact based on external signs are probably too crude to be workable (Hesterberg et al., 1977).

LITERATURE CITED

Anderson, Robert L. and Daniel G. Mosher. Nectria canker of yellow birch : Discovery of a "Lake Shore Effect." J. For. (in press)

Hesterberg, Gene A., C. Jay Wright, and Douglas J. Frederick. 1977. Decay risk for sugar maple borer scars. J. For. 74(7):443-445, illus.

Figure 1. Callused sugar maple borer attack scar

Figure 2. This 6.6" maple was almost completely girdled by sugar maple borer. Note larval gallery etched into sapwood

Figure 3. Allegheny National Forest. Numbers indicate location of plots and percent sugar maples infested. Sugar maple is concentrated in the central and eastern areas of the forest.

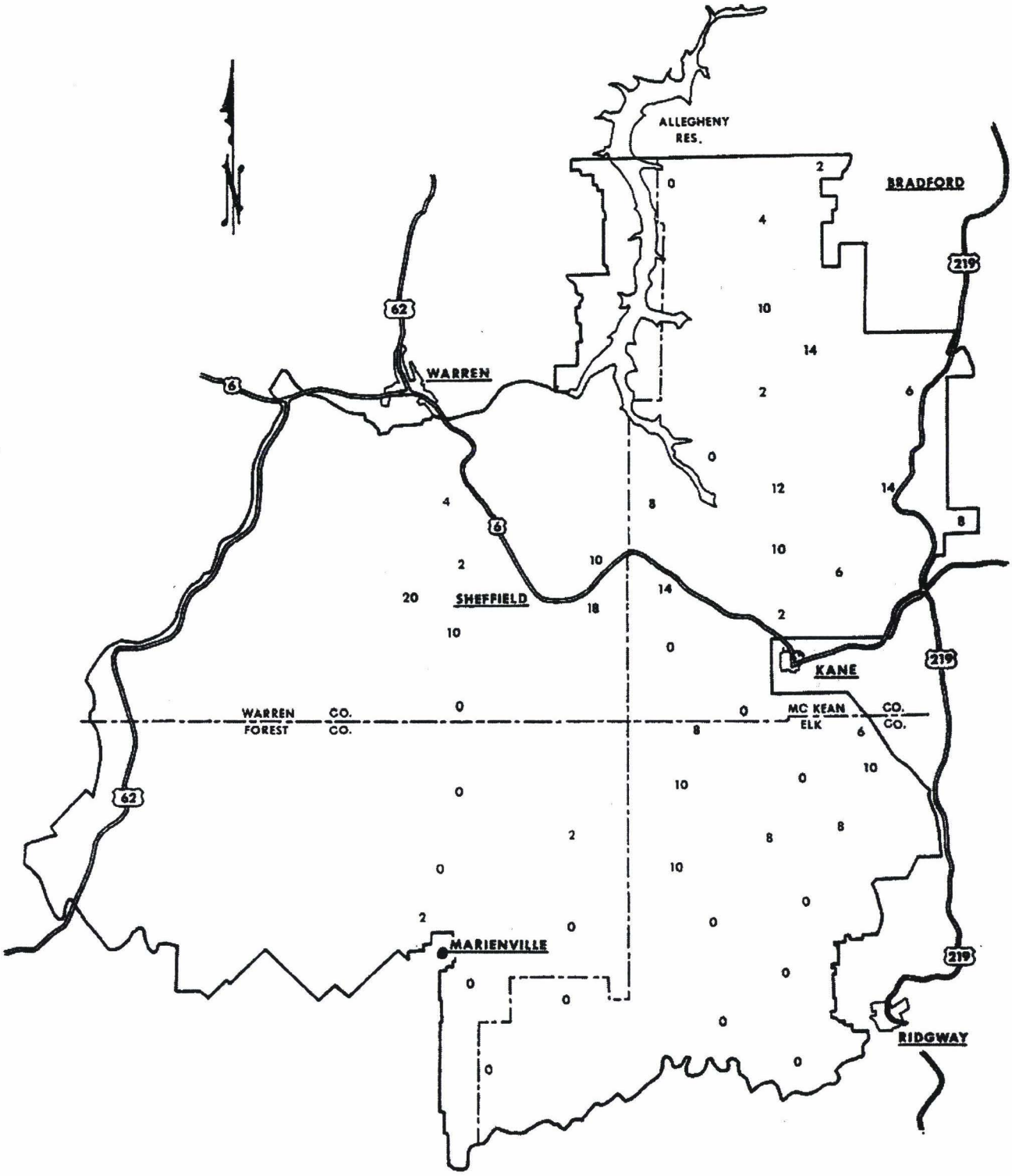

Table 1. Frequency distribution showing number of trees examined and number attacked by sugar maple borer by diameter size class indicated

Diameter Class (inches)	No. Trees Examined	No. Trees Infested	Percent Infested
2.0 - 4.9	979	11	1.1
5.0 - 7.9	660	36	5.5
8.0 - 10.9	354	34	9.6
11.0 - 13.9	148	21	14.2
14.0 - 16.9	50	13	26.0
17.0 - Above	29	3?	10.3?[1/]
All	2,220	118	5.3

1/ Many of these large diameter trees were very old and gnarly. No doubt some old attacks were obscured by heavy callus tissue.

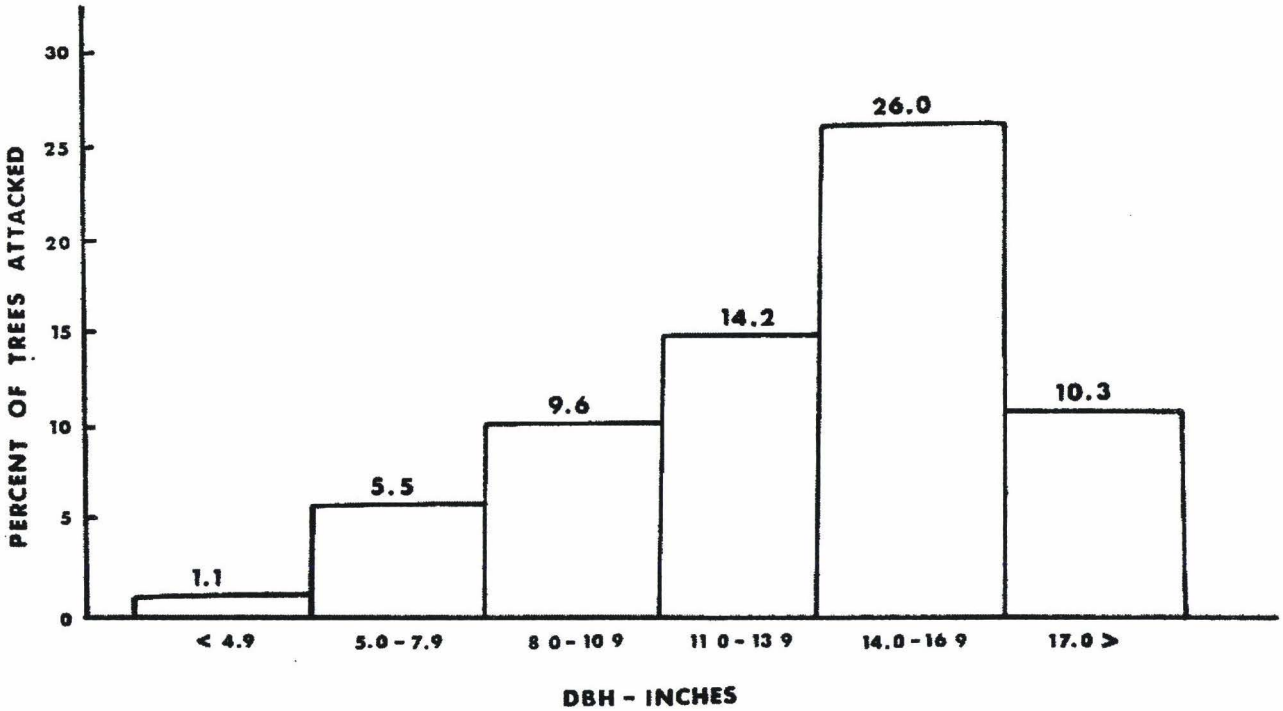

Figure 4. Relationship between diameters of sugar maples and severity of infestation.